

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Facilitating the Provision of Spectrum-Based)	WT Docket No. 02-381
Services to Rural Areas and Promoting)	
Opportunities for Rural Telephone Companies)	
To Provide Spectrum-Based Services)	
)	
2000 Biennial Regulatory Review)	WT Docket No. 01-14
Spectrum Aggregation Limits)	
For Commercial Mobile Radio Services)	
)	
Increasing Flexibility to Promote Access to and)	WT Docket No. 03-202
the Efficient and Intensive Use of Spectrum and)	
the Widespread Deployment of Wireless Services,)	
and To Facilitate Capital Formation)	

PETITION FOR RECONSIDERATION

Powerwave Technologies, Inc. (“Powerwave”), by its counsel, pursuant to Section 1.429 of the Commission’s rules, hereby submits this Petition for Reconsideration of the Report and Order in the above-captioned proceeding (“Rural order”). Powerwave is a leading supplier of radio frequency power amplifiers in both the North American and European markets.

Powerwave designs, manufactures and markets single and multi-carrier ultra-linear power amplifiers for a variety of radio services and transmission protocols. The company’s products are key components in wireless communications networks, including the cellular and Personal Communications Services (“PCS”), and for the wireless local loop market. Powerwave has also developed RF power amplifiers for third generation transmission protocols that will be used with Advanced Wireless Services (“AWS”).

Powerwave asks the Commission to reconsider only two portions of the rules adopted in the Rural order, specifically, Section 24.232 governing the Effective Isotropic Radiated Power (“EIRP”) and peak output power of PCS base stations, and Section 27.50 governing the EIRP and peak output power of AWS base stations. In both cases, for rural base stations, the Commission increased the EIRP levels from 1640 to 3280 watts and the peak output power levels from 100 to 200 watts. In doing so, however, the Commission completely neglected to consider that the underlying power limits for PCS and AWS base stations are currently under review in the Commission’s 2002 Biennial Review and AWS dockets are quite likely to be changed.¹ Because this would presumably influence the Commission’s decision on the appropriate power levels for rural base stations, Powerwave requests, in the interests of harmonization, that any determination of base station power limitations adopted in this Docket be held in abeyance pending the Commission’s decision in the 2002 Biennial Review and AWS proceedings. Powerwave does not object to the adoption of greater power limits for rural systems; only to the underlying basis for determining such limits, a matter currently under consideration in other pending proceedings.²

Background: 2002 Biennial Review of PCS Rules

The proposal to change the PCS base station power limits in the Biennial Review was initiated by Powerwave a year and a half ago. Section 24.232(a) limits the peak power of each

¹ See *Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27 and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, Notice of Proposed Rulemaking, ET Docket No. 03-264, 19 FCC Rcd 708 (2003). See also *Petition for Reconsideration of Powerwave Technologies, Inc.*, WT Docket No. 02-353, Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz bands (March 8, 2004). See also *Comments of Powerwave Technologies, Inc.*, WT Docket No. 04-356, Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands (December 8, 2004).

² A Petition for Reconsideration is appropriate in this case since it could not have been assumed that the Commission would take the action requested without any discussion of a previous, pending proposal to change the PCS and AWS power limitations.

base station transmitter to 100 watts. As Powerwave pointed out, however, as the number of PCS subscribers has increased over the years the number of carriers per transmitter required to provide the additional voice channels has also had to increase. While a peak power limit per transmitter may have made sense in the days when a single transmitter and amplifier were used with each carrier, in the age of multicarrier power amplifiers (MCPAs), the per transmitter approach has become archaic.

MCPAs are designed to combine the low power output of multiple radios, amplify the output and feed the combined signal to the base station antenna. A literal reading of the Commission's PCS rules treats the MCPA as one transmitter limited to 100 watts of output power regardless of how many carriers it is amplifying. Each carrier, therefore, is relegated some fraction of 100 watts. In single carrier amplifier designs, however, the 100 watt limitation applies to each carrier in the base station. It is this inequity that penalizes the use of MCPAs and prompted Powerwave to seek first a waiver from the Commission and then a modification of Section 24.232(a).

On April 4, 2002, the staff of the Wireless Bureau granted a waiver of Section 24.232(a) to permit Powerwave to certify a 125 watt MCPA. The staff indicated that application of the 100 watt transmitter power limit to MCPAs did not serve the underlying purpose of the rule which was to limit transmitter output power on a "per channel" basis. The staff then invited Powerwave to seek an amendment of Section 24.232(a) to allow the use of higher power amplifiers. As directed, Powerwave sought such an amendment in the context of the 2002 Biennial Review.

Powerwave recommended that the Commission simply eliminate the "belt and suspenders" approach of having both an EIRP and a peak power limit, and retain only the EIRP

limit on a per carrier basis, the practice actually employed by the industry.³ The Commission staff agreed with Powerwave and sought comment in the Biennial Review on “whether to relax the power limitations in Section 24.232(a) by either amending the rule to clarify that the output power limit of 100 watts applies on a per carrier basis in the case of MCPAs or eliminating the power limit of 100 watts in its entirety.”⁴ The Commission also proposed clarifying that the EIRP limit for PCS base stations be determined on a per carrier basis or, alternatively, be based on spectral power density (SPD).⁵

Harmonization of PCS and AWS Rules

While the Biennial Review was pending, the Commission proposed new base station power limits for AWS but failed to note that the nearly identical limits were under review in another proceeding. Twice, Powerwave reminded the Commission that the base station power limits imposed on the new AWS bands must track the PCS rules because the two services will operate in an integral manner, use the same cell sites and communicate with the same mobile

³ See *Ex Parte Filing of CTIA*, WT Docket No. 03-264 (December 14, 2004). See also *Comments of Lucent Technologies, Inc.*, WT Docket No. 03-264 (April 23, 2004). The industry use of per carrier power limits, even though Section 24.232(a) specifies that EIRP be measured on a per base station basis and peak power on a per transmitter basis, is based largely on the Commission’s clarification of the PCS rules adopted in its 1994 *Third Memorandum Opinion and Order* on Reconsideration in Docket 90-314, 9FCC Rcd 4957. The Commission explained, “[a]s regards power levels per transmitter, antenna or antenna element, it was always our intent that the 100 watts per channel and 1640 watts EIRP requirements apply to these individual components and not to the sum of all components at the entire base station provided the maximum EIRP radiated by the base station in any given direction on any given channel does not exceed 1640 watts” [Emphasis supplied.] Here, the Commission used the word “channel” instead of “carrier” at a time when the terms were often interchangeable. The significant point, however, is that the Commission made it clear that power was not to be determined on a per transmitter and/or per base station basis. Unfortunately, while industry moved ahead under this interpretation, Section 24.232(a), itself, remained unchanged.

⁴ See *Biennial Review Notice* at ¶ 17.

⁵ The Commission observed that an SPD limit would have the advantage of technological neutrality, whereas using a per carrier approach might give licensees using narrowband technologies a higher aggregate power across their authorized spectrum. A number of commenters favored this approach. CTIA, on behalf of various commenters has suggested that the Commission modify the present rule to limit base station power to the greater of 1640 watts average EIRP per carrier or 3280 watts/MHz average EIRP. See *Ex Parte Statement of CTIA*, *supra* at note 2. Powerwave has filed in support of this approach. See *Ex Parte Statement of Powerwave Technologies, Inc.*, WT Docket 03-264 (December 29, 2004).

units.⁶ Indeed, the Commission, itself, made it clear that it intended to adopt the same power limits for both services, since AWS will most likely be used to augment existing PCS wireless offerings and it would make little sense to develop different power limitations that might force the two services to use a different infrastructure.⁷ Therefore, if the Commission amends Section 24.232 for PCS as proposed in the Biennial Review, it must harmonize the same limits in Section 27.50: as PCS goes; so must AWS.

In the rural application of these services addressed in this docket, although base station power is being increased (actually doubled) to provide coverage over larger areas, the underlying basis for determining such power must be rooted in PCS and AWS rules that consistent and in harmony. Unfortunately, the rules adopted in this Docket failed even to consider the Commission's year old proposals in the Biennial Review proceeding. If the rural PCS and AWS rules go into effect as currently drafted, an anomalous situation could arise where rural systems, using multiple carriers might conceivably be limited to less power than urban systems. This makes no sense, runs counter to the Commission's goal of providing rural base stations with greater coverage and can only be assumed to have been adopted in ignorance of the pending proposals in the Biennial Review.

Powerwave notes further that this proceeding underscores again why the current rule structure simply cannot be maintained. Right now, amplifiers certified for urban PCS base stations are limited to an output power of 100 watts whereas amplifiers certified for rural PCS

⁶ *Powerwave Petition for Reconsideration*, WT Docket No. 02-353 (March 8, 2004), and *Powerwave Comments*, WT Docket No. 04-356, (December 8, 2004).

⁷ *See Report and Order*, Docket No. 02-353 at ¶ 96. In the AWS Dockets, whatever its intentions, the Commission inadvertently applies the peak power limitation on a per base station basis, rather than simply repeating the per transmitter limitation of Section 24.232(a). Thus, in addition to ignoring its proposals in the Biennial Review to change Section 24.232(a), in the AWS Dockets, the Commission even mis-stated the present rule. This clearly was an oversight.

base stations are limited to 200 watts. Manufacturers, therefore, will be required to maintain separate product lines to serve these markets – a requirement that is unnecessary from a regulatory perspective given that base station power levels are fundamentally licensee issues which are independent of the equipment deployed.

Conclusion

In light of the above, Powerwave respectfully requests that the Commission hold in abeyance application of the rural base station power limits for PCS and AWS adopted in this Docket, pending final Commission action in the 2002 Biennial Review. By doing so, the Commission will harmonize its rules for both PCS and AWS, regardless of the areas they serve, and not have to re-visit this matter in the future.

Respectfully submitted

By: /s/ Terry G. Mahn
/s/ Robert J. Ungar
Fish & Richardson P.C.
1425 K St. N.W.
Suite 1100
Washington, D.C. 20005
(202) 783-5070

Counsel for Powerwave Technologies, Inc.

January 14, 2005